chosen to share content changes with other users and accordingly merged content updates into a master copy of the document **2010** (e.g., via one of the synchronization processes described above). A sync manager of the first authoring application obtained the updates from the master copy of the document **2010** by polling the device storing the master copy.

[0106] The user interface **2000** of the first authoring application displays an alert **2030** to the first user indicating the availability of the content update. In the example shown, a text box **2030** appears in the user interface **2000**. In another embodiment, the second lock or text within the second lock can change color, pattern, or formatting. In another embodiment, an update counter increments when each new update is available.

[0107] The first user can choose to view/instantiate the changes made by the second user or to ignore the content updates. The first user can continue to edit any unlocked data units within the document **2010** while ignoring the content updates. In one embodiment, the first user must instantiate the content updates before merging her updates with the master copy. In FIG. **31**, the first user instructs the first authoring application to instantiate the content updates into the document **2010** displayed by the user interface **2000** of the first authoring application. Content changes made by the second user are now visible to the first user.

[0108] Embodiments of the disclosure may be implemented as a computer process (method), a computing system, or as an article of manufacture, such as a computer program product or computer readable media. The processes (programs) can be implemented in any number of ways, including the structures described in this document. One such way is by machine operations, of devices of the type described in this document. Another optional way is for one or more of the individual operations of the methods to be performed on a computing device in conjunction with one or more human operators performing some of the operations. These human operators need not be collocated with each other, but each can be only with a machine that performs a portion of the program.

[0109] The computer program product may be a computer storage media readable by a computer system and encoding a computer program of instructions for executing a computer process. The computer program product may also be a propagated signal on a carrier readable by a computing system and encoding a computer program of instructions for executing a computer process. The term computer readable media as used herein includes both storage media and communication media.

[0110] Those skilled in the art will appreciate that the disclosure may be practiced with other computer system configurations, including hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, minicomputers, mainframe computers, and the like. The disclosure may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices. Generally, program modules include routines, programs, components, data structures, and other types of structures that perform particular tasks or implement particular abstract data types.

We claim:

1. A method of facilitating collaborative editing of a document between a first user at a first computing device and at least one other user, the method comprising:

accessing a user copy of the document at the first computing device including accessing content of the document and accessing metadata associated with the document, the content of the document being organized into units of data;

receiving metadata updates periodically from a storage device, the metadata updates including any locks on the units of data of the document that are associated with the other user;

instantiating the received metadata updates automatically including storing the locks on the units of data of the document with the metadata associated with the document, wherein storing the locks with the metadata associated with the document prevents the first user from editing any units of data that have locks associated with the other user; and

receiving content updates periodically from the storage device, the content updates including any modifications made to the content of the document by the other user.

2. The method of claim **1**, wherein accessing the user copy of the document at the first computing device comprises:

obtaining from the storage device a download copy of the document indicating a master state of the document;

generating a base copy and the user copy of the document based on the download copy;

downloading from the storage device the metadata associated with the document; and

storing the metadata on the first computing device.

3. The method of claim **1**, wherein receiving content updates periodically from the user computing device comprises retrieving a download copy of the document from the storage device, wherein the download copy indicates a master state of the document.

4. The method of claim **3**, further comprising instantiating the received content updates only when instructed by the first user including merging the retrieved download copy of the document with the user copy of the document.

5. The method of claim **1**, further comprising:

receiving at the first computing device an indication of editing of one of the units of data of the document by the first user;

updating the metadata stored on the first computing device to lock the unit of data being edited by the first user, wherein locking the unit of data associates the unit of data with the first user; and

transmitting to the storage device automatically a metadata update based on the updated metadata stored on the first computing device.

6. The method of claim **5**, further comprising:

transmitting a content update to the storage device indicating modifications made to the unit of data edited by the first user only when instructions to transmit the content update are received from the first user.

7. The method of claim **6**, wherein transmitting the content update to the storage device comprises:

receiving instructions from the first user to transmit the content update to the storage device;

instantiating any content updates received previously from the storage device into the user copy of the document;